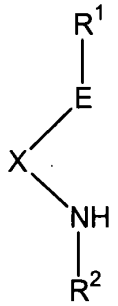
Amendments to th Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (withdrawn) A composition comprising

(1) a ligand characterized by the following general formula:



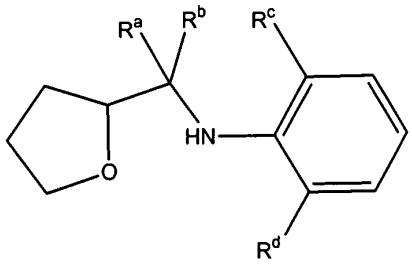
wherein, E is selected from O, S, Se, Te; each R^1 and R^2 is independently selected from the group consisting of hydrogen, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted hetercycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxyl, aryloxyl, silyl, boryl, phosphino, amino, thio, seleno, and combinations thereof; X is any covalent bridging moiety provided that X is not a benzylic bridge where the benzylic carbon atom is bound

to the NHR^2 fragment and optionally, R^1 and/or R^2 may joined together with X in a ring structure;

(2) a metal precursor compound characterized by the general formula $M(L)_n$ where M is a metal selected from Groups 3,4 and the lanthanides; L is independently selected from the group consisting of halide, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxy, aryloxy, hydroxy, boryl, silyl, amino, amine, hydrido, allyl, diene, seleno, phosphino, carboxylates, thio, 1,3-dionates, oxalates, carbonates, nitrates, sulphates, and combinations thereof; n is 1, 2, 3, 4, 5, 6, 7, 8, or 9; and

(3) optionally, at least one activator;

with the provisio that when M is zirconium, then the ligand is not a compound according to formula XVI:



wherein each R^a and R^b are each independently selected from the group consisting of alkyl, aryl, substituted aryl, heteroaryl,

substituted heteroaryl and hydrogen; and R^c and R^d are each independently selected from the group consisting of alkyl, aryl and hydrogen.

Claim 2 (withdrawn) The composition of claim 1, with the further proviso that M is not zirconium when R^1 and X are joined together in a ring structure.

Claim 3 (withdrawn) The composition of claim 1 in which the ligand is not a compound according to structure (IIa) or (IIb), where M' is zirconium.

Claim 4 (withdrawn) The composition of claim 1 in which the ligand is not a compound according to structure (IIa) or (IIb).

Claim 5 (withdrawn) The composition of claim 1 in which the ligand is a compound according to formulae (III), (IV), (V), (VI), (VII), (VIII), (IX), (X) and (XI).

Claim 6 (withdrawn) The composition of claim 5 in which the metal precursor is substantially pure with respect to the metal.

A1 Cont'd

Claim 7 (withdrawn) The composition of claim 6 in which the metal is hafnium.

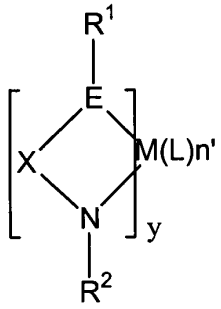
Claim 8 (withdrawn) A composition comprising a ligand characterized by formula (III), (IV), (V), (VI), (VII), (VIII), (IX), (X) or (XI);

a metal precursor compound characterized by the general formula $M(L)_n$ where M is hafnium; L is independently selected from the group consisting of halide, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxy, aryloxy, hydroxy, boryl, silyl, amino, amine, hydrido, allyl, diene, seleno, phosphino, carboxylates, thio, 1,3-dionates, oxalates, carbonates, nitrates, sulphates, and combinations thereof; n is 1, 2, 3, 4, 5, 6, 7, 8, or 9; and

optionally, at least one activator.

Claim 9 (withdrawn) The composition of claim 8 in which the metal precursor compound is about 90% or more pure with respect to the metal.

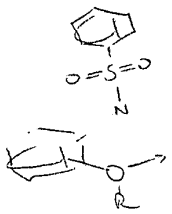
Claim 10 (currently amended) A metal ligand complex characterized by the following formula:



wherein,

E is selected from the group consisting of O, S, Se, Te;

each R^1 and R^2 is independently selected from the group consisting of hydrogen, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted ~~heterocycloalkyl~~ heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, ~~alkoxyl~~ alkoxy, ~~aryloxyl~~ aryloxy, ~~sil~~yl, boryl, phosphino, amino, thio, seleno, and combinations thereof;



X is any covalent bridging moiety provided that X is not a benzylic bridge where the benzylic carbon atom is bound to the ~~NHR~~^{2} NR^2 fragment; and optionally, R^1 and/or R^2 may be individually joined together with X in a ring structure;

M is ~~a metal selected from Groups 3,4 and the lanthanides~~ hafnium;

L is a ligand which is independently selected from the group consisting of halide, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxy, aryloxy, hydroxy, boryl, silyl, amino, amine, hydrido, allyl, diene, seleno, phosphino, carboxylates, thio, 1,3-dionates, oxalates, carbonates, nitrates, sulphates, and combinations thereof;

n' is ~~1, 2, 3, 4, 5, 6~~ 1 to 6; ~~and when M is a Group 3 or lanthanide metal, y may be 1 or 2;~~ and ~~when M is a Group 4 metal,~~ y ~~may be~~ is 1, 2, or 3.~~; provided that the metal ligand complex is not a complex according to formula (XXVII) in which M' is zirconium.~~

Claims 11-13 (canceled)

Claim 14 (currently amended) The metal ligand complex of claim 10 which is characterized by a formula selected from the group consisting of: ~~(XIX), (XX), (XXI), (XXX), (XXXI), (XXXII), (XXXIII), (XXXIV) and (XXXV).~~

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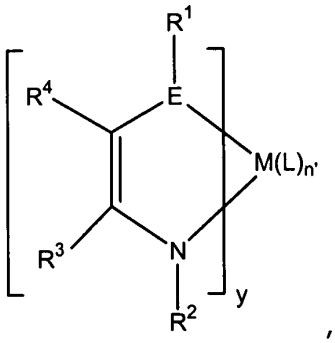
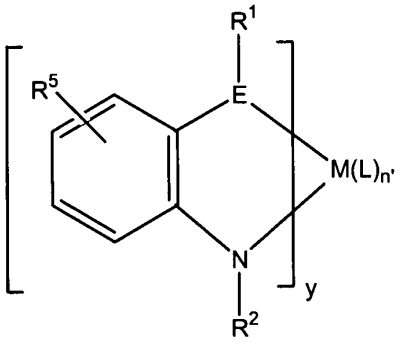
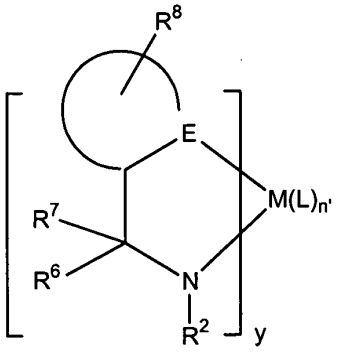


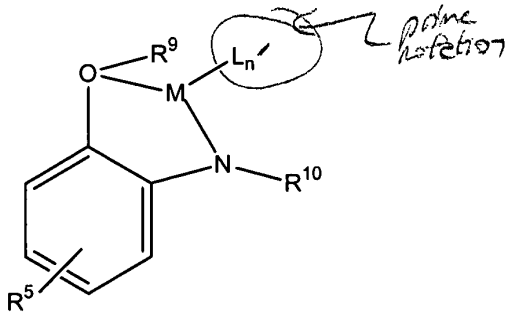
(XIX)



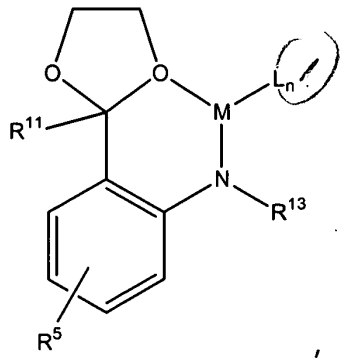
(XX)



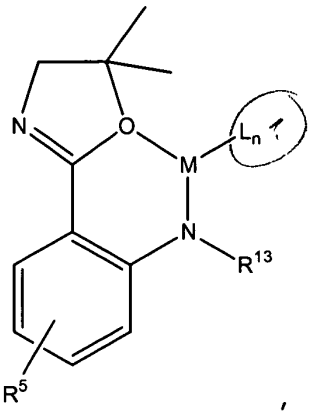
(XXI)



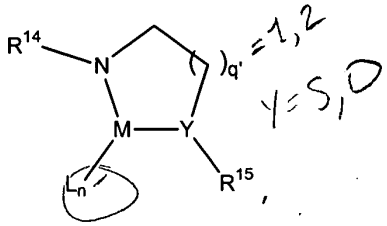
(XXX)



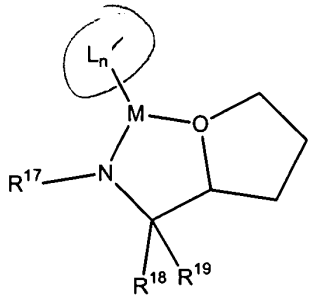
(XXXI)



(XXXII)

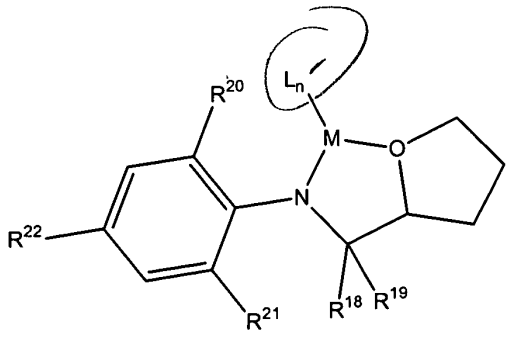


(XXXIII)



(XXXIV)

and



(XXXV);

wherein E, R^1, R^2, X, M, L, n', and y are as defined above; and wherein

R^3 and R^4 are independently selected from hydrogen, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteoraryl, substituted heteroaryl, alkoxyl, aryloxyl, silyl, boryl, phosphino, amino, thio, seleno, and combinations thereof;

R^5 is alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxyl, aryloxyl, silyl, boryl, phosphino, amino, thio, seleno, or a combination thereof;

R^6 and R^7 are independently selected from the group consisting of hydrogen, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxyl, aryloxyl, silyl, boryl, phosphino, amino, thio, seleno, and combinations thereof;

Cont'd.

R^8 is alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxyl, aryloxyl, silyl, boryl, phosphino, amino, thio, seleno, or a combination thereof;

R^9 is alkyl, substituted alkyl, aryl or substituted aryl;

R^{10} is aryl, substituted aryl, substituted alkyl, arylalkyl, heteroarylaklyl or substituted heteroarylalkyl;

R^{11} is aryl or substituted aryl;

R^{12} is hydrogen or alkyl;

R^{13} is substituted alkyl, aryl, or substituted aryl;

R^{14} is aryl or substituted aryl;

R^{15} is alkyl, aryl or substituted aryl;

R^{17} is aryl or substituted aryl;

R^{18} and R^{19} are independently hydrogen, alkyl, substituted alkyl or aryl;

R^{20}, R^{21}, and R^{22} are each independently alkyl, substituted alkyl, aryl or hydrogen;

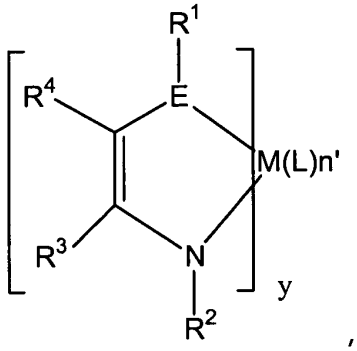
q' is 1 or 2; and

Y is S or O.

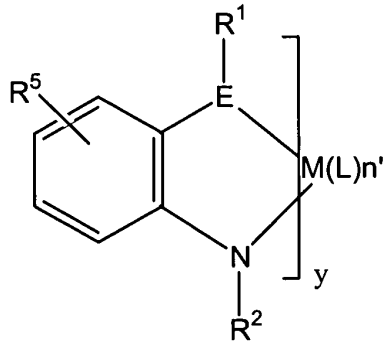
Claim 15 (original) The metal ligand complex of claim 10 which is substantially pure with respect to the metal.

Claim 16 (canceled)

Claim 17 (withdrawn) A metal ligand complex which is characterized by either of the following formulae:



(XIX)

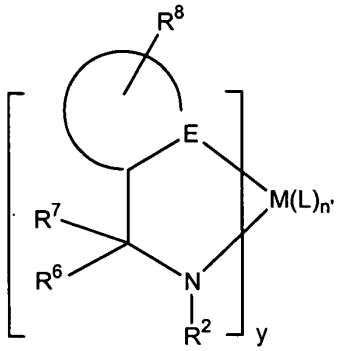


(XX)

wherein, E is selected from O, S, Se, Te; each R^1 and R^2 is independently selected from the group consisting of hydrogen,

alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted hetercycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxyl, aryloxyl, silyl, boryl, phosphino, amino, thio, seleno, and combinations thereof; M is a metal selected from Groups 3,4 and the lanthanides; and L is independently chosen from the group consisting of halide, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxy, aryloxy, hydroxy, boryl, silyl, amino, hydrido, allyl, diene, seleno, phosphino, carboxylates, thio, 1,3-dionates, oxalates, carbonates, nitrates, sulphates, and combinations thereof; y is 1,2 or 3; and n' is 1, 2, 3, 4, 5, 6.

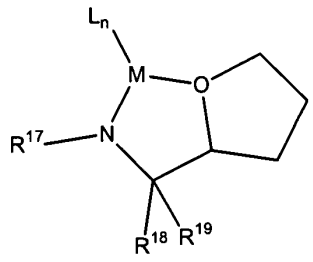
Claim 18 (withdrawn) A metal ligand complex characterized by the following formula:



where M is hafnium; E is selected from the group consisting of O, S, Se, and Te; y is 1, 2 or 3; n' is 1, 2, 3, 4, 5, 6; R^2, R^6 and R^7 are each independently selected from the group consisting of hydrogen, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted hetercycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxyl, aryloxyl, silyl, boryl, phosphino, amino, thio, seleno, and combinations thereof; and each R^8 is independently selected from the group alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted hetercycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl,alkoxyl,

aryloxyl, silyl, boryl, phosphino, amino, thio, seleno, and combinations thereof.

Claim 19 (withdrawn) The metal ligand complex of claim 18 characterized by the following formula:



(XXXIV)

wherein R^{17} is aryl or substituted aryl; R^{17} and R^{18} are independently hydrogen, alkyl, substituted alkyl or aryl; and M, L and n' are as previously defined.

Claim 20 (withdrawn) A metal ligand complex characterized by a formula selected from the group consisting of (XIX), (XX), (XXI), (XXX), (XXXI), (XXXII), (XXXIII), (XXXIV), and (XXXV) in which M is hafnium.

Claim 21 (withdrawn) The metal ligand complex of claim 20 which is substantially pure with respect to the hafnium.

Claim 22 (withdrawn) A polymerization reaction or process employing a composition according to claim 1.

Claim 23 (withdrawn) A polymerization reaction or process employing a composition according to claim 2.

Claim 24 (withdrawn) A polymerization reaction or process employing a composition according to claim 3.

Claim 25 (withdrawn) A polymerization reaction or process employing a composition according to claim 4.

Claim 26 (withdrawn) A polymerization reaction or process employing a composition according to claim 5.

Claim 27 (withdrawn) A polymerization reaction or process employing a composition according to claim 6.

Claim 28 (withdrawn) A polymerization reaction or process employing a composition according to claim 7.

Claim 29 (withdrawn) A polymerization reaction or process employing a composition according to claim 8.

Claim 30 (withdrawn) A polymerization reaction or process employing a composition according to claim 9.

Claim 31 (withdrawn) A polymerization reaction or process employing a composition according to claim 10.

Claim 32 (withdrawn) A polymerization reaction or process employing a composition according to claim 17.

Claim 33 (withdrawn) A polymerization reaction or process employing a composition according to claim 18.

Claim 34 (withdrawn) A polymerization reaction or process employing a composition according to claim 20.

Claim 35 (withdrawn) A polymerization reaction or process employing a composition according to claim 21.

Claim 36 (withdrawn) The process of any one of claims 22-35 wherein the at least one activator comprises an ion forming activator and, optionally, a group 13 reagent.

Claim 37 (withdrawn) The process of any of Claims 22-35 wherein the at least one activator comprises an ion forming activator and, optionally, a divalent reagent.

Claim 38 (withdrawn) The process of any one of claims 22-35 wherein the at least one activator comprises an ion forming activator and, optionally, an alkali metal reagent.

Cancel.

Claim 40 (withdrawn) A process for catalytically polymerizing a monomer comprising subjecting the monomer to polymerization conditions in the presence of a catalyst composition, wherein said catalyst composition comprises a metal ligand complex according to any one of Claims 1, 8, 16-18 and 20.

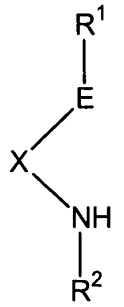
Claim 41 (withdrawn) The process of claim 40 wherein said at least one monomer is an olefin, diolefin or acetylenically unsaturated compound.

Claim 42 (withdrawn) A process for polymerizing a monomer, comprising providing a reactor, providing at least one monomer to said reactor and providing a composition or catalyst to said reactor, wherein said composition or catalyst

is defined as in any one of Claims 1, 8, 16-18 and 20 and subjecting said reactor contents to polymerization conditions.

Claim 43 (withdrawn) The process of claim 42 wherein said at least one monomer is an olefin, diolefin or acetylenically unsaturated compound.

Claim 44 (withdrawn) An array of compounds wherein each compound of the array is different from the other compounds of the array, and there are at least 8 compounds in the array, wherein each of the compounds is characterized by the general formula:



wherein, E is selected from O, S, Se, Te; each R^1 and R^2 is independently selected from the group consisting of hydrogen, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted hetercycloalkyl, aryl, substituted aryl,

heteroaryl, substituted heteroaryl, alkoxyl, aryloxyl, silyl, boryl, phosphino, amino, thio, seleno, and combinations thereof; X is any covalent bridging moiety excluding a benzylic bridge where the benzylic carbon atom is bound to the NHR^2 fragment; and optionally, R^1 and/or R^2 may joined together with X in a ring structure.

Cancel.

Claim 45 (withdrawn) The array of claim 44, wherein each compound additionally comprises a metal precursor $M(L)_n$ where M is a transition metal or main group metal or lanthanide metal and L is independently each occurrence selected from the group consisting of halide, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heterocycloalkyl, substituted heterocycloalkyl, cyclopentadienyl, substituted cyclopentadienyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxy, aryloxy, hydroxy, boryl, silyl, hydride, thio, seleno, phosphino, amino, amine, carboxylates, 1,3-dionates, oxalates, carbonates, nitrates, sulfates, perchlorates, sulfonates phosphonates and combinations thereof; and n is an integer from 1-9.